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SEMEN CHARACTERISTICS OF EMU BIRDS DURING BREEDING SEASON

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Abstract: A study was conducted to evaluate the semen characteristics in emu birds reared under farmed conditions. Semen samples were collected in the early morning during the breeding season from six mature male emu birds of 4 years age reared at University Research Farm, Madhavaram. Immediately after the collection, the individual semen sample was evaluated for volume, color, consistency, per cent motility, sperm concentration and per cent live sperms. The experimental data were statistically analyzed and expressed as mean ± S.E. The mean semen volume of 0.48 ± 0.21 ml, the per cent sperm motility of 87.53 ± 0.43 per cent, the mean value of sperm concentration of 2.33 ± 0.15 x 10^9 per ml and the mean value of per cent live sperm (89.50 ± 1.23 per cent) were recorded during the breeding season. Analysis of the quality of semen in the emu birds helps in determining the fertility and also to promote a successful artificial insemination in the emus.

Keywords: Emu, semen, sperm concentration, motility, evaluation.

Introduction

Emu is a large flightless bird belonging to the Ratite family and is reared primarily for its meat, leather and oil which are reported to have high economic value. It is a prolific breeder with an annual reproductive cycle and the breeding season varies with the latitude in a pattern that is consistent with photoperiodic control (Blache *et al*., 2001). In India, the breeding season of emus is from the month of October to February. The reports on the evaluation of emu semen are scanty and hence this study was carried out in the emu birds to assess the quality of emu semen.

Materials and Methods

The present study was conducted in six mature male emu birds of 4 years age reared at University Research Farm, Madhavaram. The semen sample from each emu bird was collected in the early morning during the breeding season. The male was allowed to mate naturally by following the non teaser technique (Malecki *et al*., 1997, Irek Malecki and

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Graeme Martin, 2005 and Rybnik *et al*., 2007). The creamy white ejaculate from the erected phallus was directly collected in to a sterile collection tube attached to a cone in artificial cloaca and was kept in a water bath at 15 ^{o}C to 20 ^{o}C.

Immediately after the collection, the individual semen sample was evaluated for volume, color, consistency, per cent motility, sperm concentration and per cent live sperms.

Semen volume

The volume of semen collected was measured directly in the calibrated collection tube attached to artificial cloaca with 0.1 ml accuracy.

Per cent sperm motility

The motility of spermatozoa in individual semen was assessed by placing a small drop of semen in the middle of the grease free glass slide and covered with a cover slip and examined under the high power of the microscope. The overall motility was assessed and expressed as percentage as per Parker *et al*. (1942).

Sperm concentration

The sperm concentration in the fresh diluted semen was determined as per Allan and Champion (1955) and expressed as millions (x 10^9) per ml.

Per cent live and dead sperm

The sperm viability of diluted semen was determined by Eosin-Nigrosin staining procedure as per Bakst and Cecil (1997).

Statistical Analysis

The experimental data were statistically analyzed and expressed as mean ± S.E.

Results and Discussion

The Mean ± SE of semen characteristics are presented in Table 1.

Semen volume

The mean semen volume of 0.48 ± 0.21 ml was recorded during the breeding season. In this study, the semen volume observed during the breeding season was within the range reported by Malecki *et al*. (1997), Bhau (2012) and Gnanaraj *et al*. (2014) in emu. Hemberger *et al*. (2001), Rozenboim *et al*. (2003), Rybnik *et al.* (2007) and Walsangkar (2010) reported higher semen volume in the ostriches. Bhau (2012) reported that variation in the output of semen in consecutive ejaculates was influenced by individual male and collection time. Malecki *et al*. (1997) reported that throughout the breeding season, the semen yield from the male emu may be affected by the seasonal changes in the testes due to the strong positive correlation between daily sperm production and testicular size.

Percent sperm motility

The per cent sperm motility of 87.53 ± 0.43 per cent was recorded during the breeding season. The per cent sperm motility observed during the breeding season in this study was in accordance with Bhau (2012) in emu, Rybnik *et al*. (2007) and Walsangkar (2010) in the ostriches, whereas Hemberger *et al*. (2001) reported lower per cent sperm motility in the ostriches. As motility is a true index of fertility, higher per cent of motility during breeding season is controlled by endocrine systems that favor fertility.

Sperm concentration

The mean value of sperm concentration of 2.33 ± 0.15 x 10^9 per ml was observed during the breeding season. The sperm concentration noticed in this study was within the range observed by Malecki and Martin (2000), Bhau (2012) and Gnanaraj *et al*. (2014) in the emu. Malecki *et al*. (1998) reported that in emus, the total output of semen and spermatozoa are affected by collection frequency. Analysis of sperm concentration is an important parameter in determining the quality of semen and to fix the extension ratio or dilution rate in artificial insemination programmes.

Per cent live sperm

The mean value of per cent live sperm of 89.50 ± 1.23 per was recorded during the breeding season. In the present study, the per cent live sperms observed during the breeding season are in accordance with the range reported by Malecki and Martin (2000) and Bhau (2012) in the emu. Gnanaraj *et al*. (2014) observed the highest per cent live sperm during the mid season in the emu. Rybnik *et al*. (2008) reported that the per cent live sperm was the same during the beginning and mid season in the ostrich semen. Malecki *et al*. (1998) reported that emu semen is characterized by a high number of live and normal spermatozoa, increasing the frequency of collection yields greater numbers of live spermatozoa without affecting their morphology. Per cent live and dead sperm count done periodically ensures that good quality semen is used for artificial insemination.

Conclusion

As the emus are monogamous and seasonal breeders the study on the semen characteristics of emu birds will provide a greater avenue to increase the production performance by adopting the advanced reproductive technologies. For a successful artificial insemination programme evaluation of the semen characteristics is highly essential.

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Table 1. Semen characteristics of emu birds during breeding season

Parameters	Mean ± SE
Volume (ml)	0.48 ± 0.21
Per cent motility (%)	87.53 ± 0.43
Sperm concentration (x 10^9/ ml)	2.33 ± 0.15
Per cent live sperms (%)	89.50 ± 1.23